In the claims

1. (Original) A method of deriving a power transfer function of a circuit, the method comprising:

running at least one test on a circuit having a plurality of inputs to obtain information on power consumption of the circuit responsive to signals applied to the plurality of inputs;

grouping the plurality of inputs into groups of at least one input based on a commonality of power consumption of the circuit for the plurality of inputs as determined from the information;

deriving a power transfer function for providing an estimate of power consumption of the circuit responsive to signals applied to the plurality of inputs of the circuit, wherein the transfer function includes a portion for each group of the groups.

2. (Original) The method of claim 1 wherein the grouping comprises:

deriving at least one coherency for each input of the plurality with respect to power consumption based on the information;

clustering the coherencies to identify the groups.

3. (Original) The method of claim 2 wherein the deriving at least one coherency further includes:

deriving, for each input of the plurality and for each test of the at least one test an average squared coherency;

wherein the clustering the coherencies further includes clustering the average squared coherencies.

4. (Original) The method of claim 2 wherein the deriving at least one coherency further includes:

taking a Fourier transform applied of each signal applied to each input of the plurality for each test of the at least one test;

taking a Fourier transform of the power consumed for each test of the at least one test;

wherein a coherency of the at least one coherency for each test is derived from the Fourier transform of the signal applied to the input for that test and the Fourier transform of the power consumed for that test.

5. (Original) The method of claim 2, wherein the clustering the coherencies comprises clustering in multi-dimensional space having a dimension for each test of the at least one test.

6. (Original) The method of claim 1, wherein the power transfer function includes coefficients, wherein the deriving the power transfer function further includes:

determining an accuracy of the transfer function; and

changing the coefficients to improve the accuracy of the power transfer function.

7. (Original) The method of claim 1 wherein each portion implements a model, wherein the deriving the power transfer function further includes:

deriving, for each group of at least one input, an impulse response function between the signals and the power consumption;

deriving a model for each group from the impulse response function derived for that group.

8. (Original) The method of claim 7 wherein the deriving the power transfer function further includes:

deriving, for each group, a frequency response function;

wherein the impulse response function for each group is derived from the frequency response function for the group.

9. (Original) The method of claim 8 wherein the deriving for each group of at least one input a frequency response function further includes:

combining the signals for each test of the at least one test applied to the inputs of each group to form a combined signal for each group;

taking a Fourier transform of the combined signal for each group and a Fourier transform of the power consumed during the at least one test;

deriving, for each group of inputs, an autoperiodgram, a cross periodgram between the group and each of the other groups, and a cross periodgram between the group and the power consumed from the Fourier transform of each combined signal and the Fourier transform of the power consumed;

solving linear equations including the autoperiodgram, the cross periodgram between the group and each of the other groups, and a cross periodgram between the group and the power consumed for each group to derive the frequency impulse function for each group.

10. (Original) The method of claim 1 further comprising:

implementing the power transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit.

11. (Original) A method of claim 1 further comprising:

running at least one test on a second circuit having a plurality of inputs to obtain information on power consumption of the second circuit responsive to signals applied to the plurality of inputs of the second circuit;

grouping the plurality of inputs of the second circuit into groups of at least one input of the second circuit based on a commonality of power consumption of the second circuit for the plurality of inputs as determined from the information;

deriving a second power transfer function for providing an estimate of power consumption of the second circuit responsive to signals applied to the plurality of inputs of the second circuit, wherein the second power transfer function includes a portion for each group of the groups of the second circuit.

12. (Original) The method of claim 1 further comprising:

simulating the circuit;

wherein the running at least one test on the circuit includes running the at least one test on the simulated circuit.

13. (Original) The method of claim 1, wherein the circuit is a circuit of an integrated circuit, the method further comprising:

deriving a second transfer function for providing an estimate of power consumption for a second circuit, wherein the second circuit is a circuit of the integrated circuit and has a plurality of inputs;

implementing the first transfer function as a first power monitoring circuit on the integrated circuit, wherein the first power monitoring circuit has a plurality of inputs coupled to the plurality of inputs of the first circuit; and

implementing the second transfer function on the integrated circuit as a second power monitoring circuit on the integrated circuit, wherein the second power monitoring circuit has a plurality of inputs coupled to the plurality of inputs of the second circuit.

14. (Original) The method of claim 1 wherein the deriving includes performing frequency domain analysis of the information.

15. (Original) The method of claim 1 wherein the grouping includes performing frequency domain analysis of the information.

16-30. Canceled.

31. (Currently Amended) A method of deriving a power transfer function of a circuit, the method comprising:

running at least one test on a circuit having a plurality of inputs to obtain information on power consumption of the circuit responsive to signals applied to the plurality of inputs;

deriving at least one power impulse function from the information, wherein each power impulse response of the at least one power impulse response is representative of at least one input of the plurality of inputs;

deriving a transfer function from the at least one power impulse function.

32. (Original) The method of claim 31 wherein the deriving includes performing frequency domain analysis of the information.

33. (Currently amended) The method of claim 31 further comprising:
implementing the ~~power~~ transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit.

34. (New) The method of claim 31 further comprising:
simulating the circuit;
wherein the running at least one test on the circuit includes running the at least one test on the simulated circuit.

35. (New) The method of claim 2 further comprising:
simulating the circuit;
wherein the running at least one test on the circuit includes running the at least one test on the simulated circuit.

36. (New) The method of claim 2 further comprising:
implementing the power transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit.

37. (New) The method of claim 6 further comprising:
simulating the circuit;
wherein the running at least one test on the circuit includes running the at least one test on the simulated circuit.

38. (New) The method of claim 6 further comprising:
implementing the power transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit.

39. (New) The method of claim 7 further comprising:
simulating the circuit;

wherein the running at least one test on the circuit includes running the at least one test on the simulated circuit.

40. (New) The method of claim 7 further comprising:
implementing the power transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit.

41. (New) The method of claim 11 further comprising:
simulating the circuit;
wherein the running at least one test on the circuit includes running the at least one test on the simulated circuit.

42. (New) The method of claim 11 further comprising:
implementing the power transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit.

43. (New) The method of claim 13 further comprising:
simulating the circuit;
wherein the running at least one test on the circuit includes running the at least one test on the simulated circuit.

44. (New) The method of claim 13 further comprising:
implementing the power transfer function in a second circuit wherein the second circuit includes inputs coupled to the inputs of the circuit.